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## SHORTER ARTICLES AND DISCUSSION

### AN ANTICIPATORY MUTATIONIST

WHENEVER any new view gains acceptance it is usually found to have been partially anticipated in the writings of various authors. The mutation theory is no exception to this rule, and the purpose of this note is to direct wider attention to the anticipation of mutationist views by Thomas Meehan. While it is known to some that Meehan held such views, it is not, I think, generally realized how consistently and persistently he advocated them throughout the course of his life.

Thomas Meehan was born near London in 1826, was trained as a gardener at Kew and afterwards came to America. He settled in Philadelphia as a horticulturist, became a prolific writer for agricultural and horticultural journals and finally, in 1891, established *Meehan's Monthly*, a journal devoted to gardening. He traveled as far as the Rocky Mountains and Alaska, was appointed state botanist for Pennsylvania, and was in 1875 elected a fellow of the American Association for the Advancement of Science. His publications included "Native Flowers and Ferns of the United States," in four volumes, and the current of his work continued until after his death in November, 1901.

But the phases of his active life which I wish to emphasize here were (1) his keenness and accuracy as an observer, and (2) his constant advocacy of discontinuity in the variations of species on the basis of his own observations, at a time when such views were by no means popular. Meehan was particularly active in the Philadelphia Academy of Science, and he contributed in all no less than 257 papers and notes to the *Proceedings* of that society between the years 1862 and 1901.

Although Meehan accepted evolution with his contemporaries and with Darwin, yet he never lost an opportunity to emphasize the probable significance of the wide variations which he frequently observed in nature, as opposed to the insensible changes which were believed to furnish the material for evolution. The character of his observations as well as the trend of his views, may be indicated by a few quotations from his writings.

In a paper entitled "Change by Gradual Modification not the Universal Law,"<sup>1</sup> he begins as follows:

*Natura non facit saltum* has been accepted as a grand canon by most naturalists, and the evident absence of connecting links has been thought fatal to theories of evolution. My studies in plant life lead me to the belief that one form will spring from another essentially different, and without any gradual or insensible modifications uniting them.

He then describes a variation in *Halesia tetraptera*.<sup>2</sup> The new form had undergone a change in leaf shape and the veins were rugose. The flowers, instead of having a narrow tube at the base, were open, cup-shaped, the pistil wholly enclosed and not exerted. This form produced good seeds and if found wild would be considered a new species.<sup>3</sup> He then refers to a variation in *Yucca filamentosa*. One plant in hundreds threw out a more branching panicle which opened two weeks earlier. Its characters remained and were continued in the progeny. After citing other cases, Meehan says:

Not only do strikingly distinct forms come suddenly into existence but once born they reproduce themselves from seed, and act in every respect as acknowledged species.

He states that a "weeping" variety of the peach came into existence "about 30 years ago," and also "ten years ago a deep blood-leaved variety appeared." The following quotations from the same paper will serve further to illustrate his views:

In over a quarter of a century of experience among living plants, I have rarely known any striking form to have originated by gradual modification, but always by one great leap. The slight changes are generally in efforts backwards; as when we sow purple beech seed, some few are a trifle paler than their parents; there is little or no hesitation in the forward leap. . . .

Forms are not only called into existence suddenly, widely different from their parents, and can reproduce themselves from seed, but they come into existence without seed agency, and the same or similar form in widely separated localities, and not all necessarily by seed from one individual.

Flowers of *Viola pedata* were sent to him from five localities in Pennsylvania, New York, Illinois and Indiana, having "the two upper petals a beautiful maroon color as in the pansy."

<sup>1</sup> *Proc. Amer. Assoc. Adv. Sci.*, 1874, B. 7-12, 1875.

<sup>2</sup> Now known as *Halesia carolina* L.

<sup>3</sup> This fuller account is taken from his later paper, "Variation in *Halesia*," *Proc. Phila. Acad.*, 1884, 32-33, Figs. 4, 1885.

Among the conclusions of this paper, which pretty well sums up his views, we find,

Morphological changes in individual plants are by no means by gradual modification,  
and

New and widely distinct species may be suddenly evolved from pre-existing forms without the intervention of connecting links.

A discussion followed in which Professor Morse, C. V. Riley, Professor Gill and Asa Gray took part, but although some agreed that there was no reason why marked changes and gradual modifications should not both play a part in evolution, yet the tendency was rather to look upon the former as sports which were of little evolutionary significance. Meehan afterwards referred to this paper as showing that:

New forms "jumped" into existence, and frequently these new forms were diverse from each other, under precisely the same "environment" as far as human knowledge had yet reached, as had been the surrounding circumstances of the parent form.

Quotations of a few of Meehan's other papers, with notes upon them, will serve to show the range of his ideas and the accuracy of his observations.

"On the Agency of Insects in Obstructing Evolution," *Proc. Phila. Acad.*, 1872, 235-37, 1872.

"On Rapid Changes in the History of Species." *Proc. Phila. Acad.*, 1884, 142-43, 1885.

"Persistence in Variations Suddenly Introduced," *Proc. Phila. Acad.*, 1885, 116, 1886.

We see that identical forms may appear simultaneously in localities widely separated; and, the circles meeting, cover a district in a comparatively short time.

"Spicate Inflorescence in *Cypripedium insigne*," *Proc. Phila. Acad.*, 1885, 30-32, 1886.

Such a belief [in jumps] would tend materially to remove difficulties in the way of theories of evolution, that now prevented a full acceptance thereof.

"On a White-seeded Variety of the Honey Locust," *Proc. Phila. Acad.*, 1885, 404, 1886.

In this paper he describes a tree of *Gleditschia triacanthos* growing near Germantown, Pa., which had seeds white instead of dark olive-brown. They also differed in shape, being nearly

orbicular, instead of narrowly ovate, and twice as long as broad. He remarks in this paper:

When variations occur it is difficult for some to believe that cross-fertilization, a return to some characteristic of an ancient parent, or some accident of climate or soil had not [been] an agency in the change.

This type of difficulty is still formidable in the minds of some. In the case he describes such explanations are excluded as inapplicable.

“On Parallelism in Distinct Lines of Evolution,” *Proc. Phila. Acad.*, 1886, 294–95, 1887.

Meehan refers<sup>4</sup> to a paper given by him at the Troy meeting of the American Association (1870), “On the Introduction of Species by Sudden Leaps.” But there is no such paper in the report, although he gave three other papers dealing respectively with fasciation, pollination by insects, and the influence of nutrition on sex. His last paper, published posthumously, in *Proc. Phila. Acad.*, 54, 33–36 (1902), is in two parts, dealing with “The Bartram Oak, in Connection with Variation and Hybridism” and “Observations on the Flowering of *Lobelia cardinalis* and *Lobelia syphilitica*.” He may well be described with justice and accuracy as an anticipator of the mutation theory, not on theoretical grounds but on the basis of his own keen observations.

Meehan also contributed to the earlier volumes of the AMERICAN NATURALIST, the *Botanical Gazette*, *Torrey Bulletin* and other journals during his active life. One of these<sup>5</sup> characteristically sets forth his mutationist views.

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<sup>4</sup> *Proc. Phila. Acad.*, 1885, 30.

<sup>5</sup> On the Relation Between Insects and the Forms and Character of Flowers,” *Bot. Gazette*, 16, 176–77, 1891.